



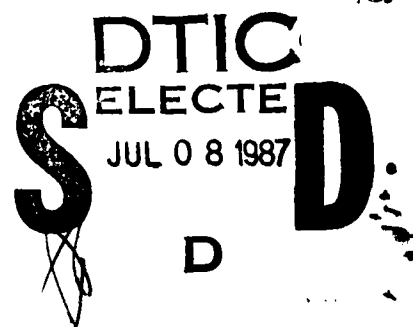
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Development and Psychometric Testing of the Strategy Inventory for Language Learning (SILL)

Rebecca L. Oxford

Kinton, Inc.

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Instructional Technology Systems Technical Area
Training Research Laboratory



U.S. Army

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EDGAR M. JOHNSON
Technical Director

WM. DARRYL HENDERSON
COL, IN
Commanding

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Kinton, Inc.

Technical review by
Joan Harman
John A. Lett, Jr., Defense Language Institute



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Rebecca L. Oxford

Kinton, Inc.

for

Contracting Officer's Representative
Ray S. Perez

Instructional Technology Systems Technical Area
Zita M. Simutis, Chief

Training Research Laboratory
Jack H. Hiller, Director

U.S. ARMY RESEARCH INSTITUTE FOR THE BEHAVIORAL AND SOCIAL SCIENCES
5001 Eisenhower Avenue, Alexandria, Virginia 22333-5600

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FOREWORD

The Strategy Inventory for Language Learning (SILL) is a self-report survey of the frequency with which an individual uses various strategies for learning a second or foreign language. The development and psychometric testing of the SILL are the subject of this report. The research contained here is part of a larger investigation called the Language Skill Change Project, which is intended to assess the amount and kind of change occurring in military intelligence careerists' language skills after formal language training is completed.



EDGAR M. JOHNSON
Technical Director

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DEVELOPMENT AND PSYCHOMETRIC TESTING OF THE STRATEGY INVENTORY
FOR LANGUAGE LEARNING (SILL)

EXECUTIVE SUMMARY

Requirement:

The U.S. Army Research Institute for the Behavioral and Social Sciences and the Defense Language Institute, in collaboration with other governmental agencies, are conducting a longitudinal Language Skill Change Project to determine the factors related to changes in military intelligence careerists' second language skills after formal language training is over. Learning strategies, i.e., steps taken by the learner that are intended to facilitate the acquisition, retention, and retrieval of new knowledge, may be an important factor in determining what is learned in the first place and what is eventually lost or maintained after the end of language training. A major prerequisite for the Language Skills Change Project was therefore the development of a reliable and valid instrument to measure the frequency of use of various second language (L2) learning strategies.

Procedure:

The author conducted an extensive research review on L2 Learning strategies, reported elsewhere (Oxford, 1986d). Using the research review, the author then developed a comprehensive taxonomy of L2 learning strategies and later expanded the taxonomy to show how each strategy related to all four language skills, reading, listening, writing, and speaking. The SILL items were based on the taxonomy. A 23-person clinical trial and a 483-person field test were conducted for the SILL. Factor analyses and other statistical procedures were applied to assess the quality of the survey.

Findings:

Results indicated that the SILL had very high reliability and validity coefficients. The internal consistency reliability for the whole survey was .95. Content validity based on ratings of the correspondence between SILL items and taxonomy items (as judged simultaneously by two raters) was .98. Factors were relatively clear and interpretable. Some of the key factors related to general study skills, functional practice, searching for and communicating meaning, formal practice, mnemonics, and a combination of "solo" strategies (strategies used without another person present) and fear of using the L2.

Utilization of Findings:

The SILL will be used during the Language Skill Change Project as a predictor or correlate of (a) L2 performance during training as measured by language grades; (b) overall L2 proficiency at various points in time; and (c) changes, positive or negative, in L2 skills after formal language training is over. In the same project, the SILL will also be correlated with a number of other cognitive, personality, and motivational variables.

In addition to its immediate research use in the Language Skill Change Project, the SILL has many other practical uses for a variety of individuals and groups. First, students can employ the SILL to assess their own use of L2 strategies and to determine whether the strategies they are using are the most appropriate for their own language learning goals and requirements. Second, instructors, whom studies show to be generally unaware of their students' learning strategies, can use the SILL to heighten their awareness of learning strategies of students. Third, instructors can use SILL results to assess the appropriateness of their students' strategies, by individual or by class. Fourth, on that basis instructors can plan and present instruction to teach improved use of strategies. Fifth, counselors can use SILL results to counsel students who are having trouble in their language classes. Sixth, curriculum designers and language program administrators can refer to aggregated SILL results while doing long-term planning that integrates learning strategies. Seventh, researchers can continue to employ the SILL as a research tool in universities, schools, businesses, the military, and other settings. The SILL is already being put to several of these uses.

DEVELOPMENT AND PSYCHOMETRIC TESTING OF THE STRATEGY INVENTORY
FOR LANGUAGE LEARNING (SILL)

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DEVELOPMENT AND PSYCHOMETRIC TESTING OF THE STRATEGY INVENTORY FOR LANGUAGE LEARNING (SILL)

INTRODUCTION

This report describes the development of the Strategy Inventory for Language Learning (SILL), a self-report survey of strategies for second language (L2) learning. The SILL was created by O-C Associates, Inc., in 1985-1986 on behalf of the Army Research Institute for the Behavioral and Social Sciences, known as ARI, and the Defense Language Institute Foreign Language Center, or DLI. Field testing of the SILL took place at DLI in November 1985, followed by analyses and revisions in early 1986. Further analyses of the field test data are underway. Additionally, more validity and reliability data have been collected this spring at Purdue University, one of several universities which has asked permission to use the SILL.

The purpose of the SILL is to assess the frequency of use of various L2 learning strategies, including those which directly relate to the learning materials (direct or primary strategies) and those which indirectly support or enhance learning (indirect or support strategies).

The sponsors of the development of the SILL are using the survey in the Language Skill Change Project as a predictor or correlate of: (1) L2 performance during training as measured by DLI grades; (b) overall L2 proficiency at various points in time; and (c) changes, positive or negative, in L2 skills after formal training is over. In the same project, the SILL is also being correlated with a number of other cognitive, personality, and motivational variables.

In addition to its immediate research use in the Language Skill Change Project, the SILL has many other practical uses for a variety of individuals and groups. First, students can employ the SILL to assess their own use of L2 strategies and to determine whether the strategies they are using are the most appropriate for their own language learning goals and requirements. Second, instructors, whom studies show to be generally unaware of their students' learning strategies, can use the SILL to heighten their awareness of learning strategies of students. Third, instructors can use SILL results to assess the appropriateness of their students' strategies, by individual or by class. Fourth, on that basis instructors can plan and present instruction to teach improved use of strategies. Fifth, counselors can use SILL results to counsel students who are having trouble in language classes. Sixth, curriculum designers and language program administrators can refer to aggregated SILL results while doing long-term planning which integrates learning strategies. Seventh, researchers can continue to employ the SILL as a research tool in universities, schools, businesses, the military, and other settings. The SILL is already being put to several of these uses.

THE IMPORTANCE OF L2 LEARNING STRATEGIES

Learning strategies have been defined as "cognitions or behaviors that a learner engages in during learning that are intended to influence the encoding

process so as to facilitate the acquisition, retention, and retrieval of new knowledge" (Weinstein & Rogers, 1984, p. 3). Similarly, another definition describes learning strategies as steps taken by the learner to facilitate the acquisition, storage, retrieval, or use of information (O'Malley, Russo, & Chamot, 1983). Learning strategies can be contrasted with teaching techniques, also known as instructional strategies, which are actions taken by the teacher to structure and present information in a way that will help students learn (Stewner-Manzanares, Chamot, O'Malley, Kupper, & Russo, 1983).

Wenden (1985) provided four explanations for the significance of learning strategies. First, learning strategies are the key to learner autonomy. Second, one of the goals of L2 training should be to facilitate learner autonomy, although this facilitation might require overcoming the learner's belief that learning is classroom-dependent or teacher-dependent. Third, learning strategies are a source of insight into the difficulties of unsuccessful learners, whose learning problems are often related to not having an appropriate repertoire of learning strategies. Fourth, teachers should become attuned to their students' learning strategies through observation and formal strategy assessment.

Several facts gleaned from existing research can be used to support Wenden's arguments for the importance of learning strategies. First, studies show that learning strategies can be improved or modified through training (Dansereau, 1978; O'Malley, Russo, & Chamot, 1983; O'Malley, Russo, Chamot, Stewner-Manzanares, & Kupper, 1983; Weinstein, Schulte, & Cascallar, 1984). Instructional manipulation is often most effective for low-ability students (Mayer, 1980).

Second, successful language learners tend to use "good" strategies more often than unsuccessful language learners (Cohen, in press; Naiman, Frolich, & Todesco, 1975; Reiss, 1983; Rubin, 1975, 1981; Rubin & Thompson, 1982).

Third, awareness of the strategies which are the most relevant to an individual's own set of L2 needs is likely to enhance the L2 learning of the individual. Learning strategies are highly individualized and personalized. It is impossible to say unequivocally that any given strategy is intrinsically good for everyone--with certain possible exceptions such as practice. The goodness or utility of any strategy depends on a host of factors (see Politzer & McGroarty, 1983), such as: (a) the stage of language learning (e.g., novice versus advanced) of the L2 learner; (b) the purpose for which the learner wants to use the language (e.g., speaking a little of the L2 for tourist travel abroad versus conversing like a native speaker; reading academic journals in one's specialty versus conducting intensive business negotiations in the L2); and (c) the nature of the L2 (e.g., use of nonromanized letters, romanized letters, or orthographic characters). Learner attributes such as personality, attitude, motivation, cognitive style, and language aptitude are also crucial in determining the usefulness of a given learning strategy to a particular individual.

Having established the importance of L2 learning strategies, let us now turn to the first step in the development of the survey: the design of a taxonomy of L2 learning strategies.

THE TAXONOMY FROM WHICH THE SILL WAS DEVELOPED

In order to devise the SILL, it was necessary to create a comprehensive taxonomy of L2 learning strategies. The taxonomy was developed after an extensive research review, which resulted in several papers and articles (Oxford, 1986d; Oxford & Penn, 1985a,b; Oxford-Carpenter, 1985a,b).

The original, simplified taxonomy was built in part on the second language learning strategy work of Bialystok (1981); Bialystok and Frolich (1978); Naiman, Frolich, and Todesco (1975); O'Malley (1984); O'Malley, Russo, and Chamot (1983); Rubin (1975, 1981); Rubin and Thompson (1982); Stewner-Manzanares et al. (1983); and others. It also drew upon general academic learning strategies as researched by Dansereau et al. (1975); Dansereau (1978); Weinstein (1978); and Weinstein, Schulte, and Cascallar (1984). The current author also added a number of new categories of strategies and finally expanded the whole taxonomy to show how every strategy applies to each of the four language skills of reading, writing, listening, and speaking. Many of the ideas are unique in the expanded taxonomy. No such detailed taxonomy of second language learning strategies has yet been published, insofar as could be determined by the research review. The taxonomy presented here is known as the Oxford Taxonomy of Second Language Learning Strategies to distinguish it from other taxonomies of L2 learning strategies or general academic learning strategies (see those mentioned above, as well as Weinstein & Mayer, 1985; Wenden, 1985).

This taxonomy has advantages over some other learning strategy taxonomies in that it:

- o Contains a two-part organization rather than a more complex organization
- o Covers the whole range of L2 learning strategies within the two-part classification
- o Clearly defines the strategies contained in it
- o Applies every strategy to each relevant language skill (in the expanded version of the taxonomy)
- o Provides, where necessary, some clarifying examples of strategy use
- o Is based on an extensive review of empirical research, not just on personal experience or classroom observation
- o Is designed for practical use.

The strategies in the taxonomy are not "prescriptive" in the sense of being universally applicable to all types of learners. In fact, some strategies (e.g., certain types of mnemonics) are most applicable at early stages of L2 learning and may not be useful later. Other strategies (e.g., long-term goal setting) may be relevant at all stages of the learning process but especially relevant as the learner becomes more advanced. As mentioned earlier, in addition to stage of language learning, several other variables affect the usefulness of a given strategy to an individual learner: language aptitude,

motivation, attitude, personality characteristics, cognitive style, language being learned, previous language learning experience, and so on.

The taxonomy in either its simplified or its expanded form can be used by students, language teachers, curriculum developers, language program administrators, and researchers in a variety of ways. For example, students are likely to find new strategy ideas in the taxonomy and may be in a position to judge which ones would be most useful and comfortable for them as learners. Teachers can use the taxonomy to help structure strategy training or simply to become more aware of their students' strategies. Curriculum developers and language program administrators can create strategy training plans using the taxonomy. Researchers can obtain fresh ideas for investigations based on the taxonomy.

The simplified form of the taxonomy is useful as a quick aid for understanding any given strategy and for placing that strategy in a context with similar strategies. The expanded taxonomy contains full definitions and examples, with each strategy linked to the relevant language skill(s). In the expanded taxonomy, the direct/primary group contains 47 strategies, almost half of which are mnemonic (memory-enhancing) strategies. Of the total group of 47, three strategies apply to only one language skill, 16 apply to two language skills, five apply to three language skills, and 23 apply to all four language skills. All 16 strategies listed in the indirect/support group of strategies apply to all four language skills. (Note that in the expanded taxonomy a given strategy is applied only to those language skills which seem to have a very natural relationship with the strategy, although it also would have been possible to "stretch" the strategy-to-skill linkages artificially.)

The L2 learning strategy taxonomy as presented in this report and explained more fully elsewhere (Oxford, 1986d) is basically uncomplicated. Regardless of which version--simplified or expanded--is considered, the taxonomy contains only two main categories of strategies, direct or primary and indirect or support. Some definitions of these and other key terms are presented next. Key terms include:

- o Direct (primary) and indirect (support) strategies
- o Cognitive and metacognitive strategies
- o Syntactic and semantic strategies
- o Formal and functional practice
- o Social strategies
- o Other strategies--study, affective, and textual.

Direct (Primary) and Indirect (Support) Strategies

The taxonomy embodies a major distinction between direct or primary strategies and indirect or support strategies. Primary strategies are used to operate directly on the learning materials, while support strategies are used to establish an appropriate learning attitude and help the learner cope with distractions, fatigue, frustration, and so on (Dansereau, 1978). In a related vein, Rubin (1981) spoke of direct versus indirect strategies, the former contributing directly and the latter contributing indirectly to learning. Table 1 presents direct or primary strategies in the simplified version of the taxonomy, while Table 2 shows indirect or support strategies in the

Table 1

Oxford Taxonomy of Second Language Learning Strategies: Direct or Primary Strategies (Simplified Form)

L1 to L2 Strategies

Translation	Translating word-for-word (verbatim) from one language to another
Interpretation	Rendering the most appropriate meaning from one language into another in a non-verbatim fashion
Transfer	Using previously acquired L1 linguistic knowledge to facilitate new L2 learning; usually involves a period of using an "interlanguage"
Contrastive Analysis	Analyzing elements of the L1 and the L2 to determine likenesses and similarities
Analogy	Inferring L2 rules by analogy with the L1

Inferencing Strategies

Using all available information to guess meanings of new L2 items, predict outcomes or fill in gaps; such information might include knowledge of the L2 or the L1, knowledge of the topic, perception of the speaker (tone of voice, emphasis, body language, distance, status, sex), and awareness of the situation

Emphasis/Summary Strategies

Notetaking	Writing down some key points, either in the L1 or the L2
Outlining	Making a mental or written outline of the main idea and other important points
Summarizing	Making a summary of information presented
Highlighting	Marking, underlining, or otherwise highlighting a new word, phrase, or rule
Using Context-Signalling Devices	Focusing on emphasis markers ("This is important") to help establish context

Table 1 (Continued)

Clarification/Verification
Strategies

Clarification	Asking a teacher or native speaker to repeat, clarify, paraphrase, explain, or give examples of a specific L2 item
Verification	Asking for verification of an item, asking if a specific utterance is correct, asking if a rule fits a particular case, paraphrasing or repeating a sentence to verify what was said
<u>Resourcing</u>	Using L2 resources or reference materials such as dictionaries, glossaries, computer-assisted instructional routines, tape recorders, etc.
<u>Formal Practice</u>	
Rule Generation/Revision	Generating one's own internal rules about the L2 and revising them when new information appears
Rule Search/Application	Looking for, being aware of, and/or using rules in the L2
Rule Exercises	Practicing rules through language exercises orally or in writing
Rule Overgeneralization	Simplifying the rules of the L2 and applying them too generally in practice (useful in early stages of L2 learning)
Deductive Reasoning	Using a syllogistic, "if-then" model to reason about specific elements of the L2
Analysis	Finding the meaning of an L2 expression by breaking it down into parts
Aural/Oral Practice	Practicing new L2 sounds in a variety of ways
Repetition	Repeating a word or phrase
Imitation	Using imitation of a native speaker or writer to enhance one's own language performance
Formalized Patterns	Being aware of and/or using prefabricated or formalized speech routines

Table 1 (Continued)

Functional Practice

Recombination	Constructing a meaningful sentence or longer language sequence by combining known elements in new ways
Naturalistic Practice	Practicing the L2 in natural L2 settings, such as movies, lectures, parties, and conversations with native speakers
L2 Self-Talk	Conducting brief or extended conversations with oneself in the L2 in order to practice
L2 Games	Using L2 games to improve one's L2 proficiency

Communication Strategies

Ways to Keep Communication Moving	In an attempt to continue the oral or written communication, using L2 filler words ("uh," "Let's see..."), synonyms, circumlocutions, mime, gestures, compensatory code switching, anglicization, avoidance of topics in which the learner does not feel confident, word coinage, and lexical substitution.
Using All Available Information	Using all available information to know how to express oneself in the L2 or to assess the appropriateness of one's L2 expressions; such information might include knowledge of the L2 or the L1, knowledge of the topic, knowledge of the culture, perception of oneself as the speaker or writer, awareness of the situation, awareness of what has already been said or written

Mnemonic Strategies

List Making	Making a list of new L2 material to be memorized without grouping it in any particular way
List Breaking	Dividing a long list of L2 items into parts in order to learn the parts one at a time
Listing by Attribute	Classifying or reclassifying the L2 material to be learned based on common attributes (e.g., nouns) or on opposition (e.g., black-white, hot-cold)

Table 1 (Continued)

Mnemonic Strategies
(Continued)

Acronyms	Being aware of and/or using an acronym as an aid for remembering the whole set of L2 words
Loci	Remembering L2 information by remembering its location in the notebook, on the page, on the blackboard, or in a mental picture
Flashcards	Listing a new L2 word or phrase on one side of the card and its L1 equivalent on the other
Situationalism	Remembering a new word by associating it with the situation in which it was first heard or read by the learner
Contextualization	Being aware of and/or creating a context in order to remember new L2 words or phrases
Mechanical Tricks	Using mechanical tricks for memorizing, e.g., moving cards from one pocket to another when the words are learned, or color-coding types of words
Rhyming	Using rhymes or associated techniques, such as alliteration or assonance, to remember words according to their sound characteristics
Auditory Association	Associating a new L2 word with a known word that sounds like it
Imagery	Using a mental image to help remember a new word; making a drawing of the new material
Keyword Method	Remembering a new L2 word by (a) identifying a familiar L1 word that sounds like the L2 word (auditory link) and (b) generating an easily recalled mental image of the L2 word "interacting" with the L2 word (visual link)
Elaboration	Relating new information to other concepts in memory by means of associations, which may be simple or complex, commonplace or bizarre
Physical Response or Physical Association	Memorizing a new L2 word by making a physical response, acting out a new word, or associating a word with a physical sensation in order to remember it

Table 1 (Continued)

Mnemonic Strategies
(Continued)

Phonological Aids	Using accent marks, phonetic spelling, or any other means to memorize the sounds
Rote	Memorizing by rote a word, phrase, or rule without fully understanding why or how it is used
Silent Rehearsal with Delayed Production	Upon encountering a new L2 word, silently repeating it to oneself so as to memorize it (without yet using it)
Whole Passage	Memorizing a whole passage as a unit, learning songs, jingles, commercials, poems, etc.

Table 2

Oxford Taxonomy of Strategies: Indirect or Support Strategies (Simplified Form)

General Study Strategies

Scheduling	Devising and using appropriate schedules to complete assignments regularly, on time, and in suitable increments
Organization	Organizing one's work in the most efficient manner
Environment	Creating an optimal environment for learning (involving factors such as noise, temperature, amount of space, etc.)

Planning and Goal-Setting Strategies

Long-Term Goal Setting	Setting one's own long-term goals for L2 learning
Short-Term Goal Setting	Setting one's own short-term goals for L2 learning (by hours, days, weeks)
Functional Planning	Planning for and rehearsing L2 linguistic components necessary to carry out an upcoming language task

Attention-Enhancing Strategies

Advance Organizers	Making a general but comprehensive preview of the organizing concept or principle in an anticipated learning activity
Directed Attention	Deciding in advance to attend in general to an L2 learning task and to ignore irrelevant distractors; may include attention-enhancing techniques such as active listening, silently answering even when not called upon, reading aloud to oneself, etc.
Selective Attention	Deciding in advance to attend to specific aspects of L2 input or situational details that will cue the retention of specific L2 information

Self-Management Strategies

Self-Monitoring	Analyzing one's own errors and correcting one's own mistakes
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Table 2 (Continued)

Self-Management Strategies
(Continued)

Self-Assessment,
Self-Evaluation,
Self-Estimation

Checking the outcomes of one's own language learning against an internal or external measure of completeness, quality, or accuracy; measuring one's own progress against short-term or long-term L2 goals

Self-Diagnosis and
Self-Prescription

Assessing one's own strengths and weaknesses in the L2 and determining what must be done to deal with the weaknesses

Self-Reinforcement

Arranging for tangible rewards for oneself when an L2 learning task is successfully completed

Social Cooperation
Strategies

Working with one or more people to obtain feedback, share information, review, correct, practice, etc.

Creating Practice
Opportunities

Consciously seeking out or creating as many opportunities as possible to practice the L2; for example, going to movies or social events, listening to the radio or to records, finding L2 pen-pals, meeting native speakers, and reading L2 books or magazines

Cultural Orientation

Studying the culture, history, and society surrounding the L2 in order to better understand and/or use the L2

Affective Strategies

Self-Encouragement

Saying or writing positive statements to oneself in the L1 or the L2 in order to feel more confident or capable in one's L2

Anxiety Reduction

Reducing anxiety, especially when oral production demands are high, by means of relaxation, meditation, and other techniques

Perseverance

Continuing to study the L2 despite the difficulty of the material or the complexity of the task.

simplified form. The two subsequent tables summarize the expanded taxonomy in two parts: direct or primary (Table 3) and indirect or support (Table 4). Appendix A contains the full-length version of direct or primary strategies in the expanded taxonomy, while their indirect or support counterparts are found in Appendix B.

Cognitive and Metacognitive Strategies

The distinction between "cognitive" and "metacognitive" learning strategies is sometimes used. Cognitive learning strategies involve manipulation of learning materials in order to enhance learning or retention (Stewner-Manzanares et al., 1983). Examples include using mnemonic devices, thinking inferentially, and recombining already learned material into new patterns. Cognitive learning strategies are listed under direct strategies in the taxonomy.

Metacognitive learning strategies involve knowledge and regulation of one's own learning. In metacognitive strategies the learner "steps back" and considers his or her own cognitive processes (Stewner-Manzanares et al., 1983). Weinstein and Rogers (1984, pp. 3-4) defined metacognition as

individuals' knowledge about their own cognitive processes as well as their abilities to control these processes by organizing, monitoring, and modifying them as a function of learning outcomes....Operationally, the use of metacognitive strategies is often described as comprehension monitoring. Comprehension monitoring involves establishing learning goals, assessing the degree to which these goals are being met and, if necessary, modifying the strategies being used so as to more closely meet the goals.

Metacognitive strategies include self-monitoring, self-assessment, and self-reinforcement as well as the ability to set long-term goals and determine one's own optimal learning patterns and needs. In the taxonomy, metacognitive strategies are embedded under indirect strategies, although the term "metacognitive," like "cognitive," is not used in the taxonomy. Stewner-Manzanares et al. (1983) stated that cognitive learning strategies should always be accompanied by metacognitive learning strategies. According to Weinstein and Rogers, comprehension monitoring or metacognition is an active learning strategy necessary for success in any learning situation, but it is especially needed when the learner is chiefly responsible for his or her own mastery of a task.

Syntactic and Semantic Strategies

Clark and Clark (1977) suggested that two strategies are used frequently in combination: syntactic and semantic. Syntactic strategies rely on the use of function words, suffixes, prefixes, and certain categories of content words. Semantic strategies relate to real objects, states, and events (as seen in observation of the environment or in cultural contextual clues). The taxonomy places both of these types of strategies under direct or primary strategies.

Table 3

Summary of Oxford Taxonomy of Second Language Learning Strategies:
Direct or Primary Strategies (Expanded Form)

Strategy	Main skills covered				Number of skills covered
	L	R	S	W	
L1-to-L2 strategies					
Translation	x	x	-	-	2
Interpretation	x	x	-	-	2
Transfer	x	x	-	-	2
Contrastive analysis	x	x	x	x	4
Analogy	x	x	x	x	4
Inferencing strategies					
	x	x	-	-	2
Emphasis/summary strategies					
Notetaking	x	x	x	x	4
Outlining	x	x	x	x	4
Summarizing	x	x	x	x	4
Highlighting	-	x	-	x	2
Using context-signalling devices	x	x	x	x	4
Clarification/verification strategies					
	x	x	x	x	4
Resourcing					
	x	x	x	x	4
Formal practice					
Rule generation/revision	x	x	-	-	2
Rule search/application	x	x	x	x	4
Rule exercises	-	-	x	x	2
Rule overgeneralization	x	x	x	x	4
Deductive reasoning	x	x	x	x	4
Analysis	x	x	-	-	2
Aural/oral practice	x	x	x	x	4
Repetition	x	x	x	x	4
Imitation	-	-	x	x	2
Formalized patterns	x	x	x	x	4

Table 3 (Continued)

Strategy	Main skills covered				Number of skills covered
	L	R	S	W	
Functional practice					
Recombination	x	x	x	x	4
Naturalistic practice	x	x	x	x	4
L2 self-talk	x	x	x	x	4
L2 games	x	x	x	x	4
Communication strategies					
Ways to keep communication moving	x	-	x	x	3
Using all available information	-	-	x	x	2
Mnemonics					
List making	x	x	-	x	3
List breaking	x	x	-	x	3
Listing by attribute	x	x	-	x	3
Acronyms	x	x	x	x	4
Loci	-	x	-	-	1
Flashcards	x	x	-	-	2
Situationalism	x	x	x	x	4
Contextualization	x	x	x	x	4
Mechanical tricks	x	x	-	x	3
Rhyming	x	x	x	x	4
Auditory association	x	-	-	-	1
Imagery	x	x	-	-	2
Keyword method	x	x	-	-	2
Elaboration	x	x	-	-	2
Physical response or physical association	x	x	-	-	2
Phonological aids	x	-	-	-	1
Rote	x	x	-	-	2
Silent rehearsal with delayed production	x	x	-	-	2
Whole passage	x	x	x	x	4

Table 4

Summary of Oxford Taxonomy of Second Language Learning Strategies:
Indirect or Support Strategies (Expanded Form)

Strategy	Main skills covered				Number of skills covered
	L	R	S	W	
General study strategies					
Scheduling	x	x	x	x	4
Organization	x	x	x	x	4
Environment	x	x	x	x	4
Planning and goal-setting					
Long-term goal setting	x	x	x	x	4
Short-term goal setting	x	x	x	x	4
Functional planning	x	x	x	x	4
Attention-enhancing strategies					
Advance organizers	x	x	x	x	4
Directed attention	x	x	x	x	4
Selective attention	x	x	x	x	4
Self-management strategies					
Self-monitoring	x	x	x	x	4
Self-assessment/self-evaluation/self-estimation	x	x	x	x	4
Self-diagnosis and self-prescription	x	x	x	x	4
Self-reinforcement	x	x	x	x	4
Social cooperation strategies					
	x	x	x	x	4
Cultural orientation					
	x	x	x	x	4
Creating practice opportunities					
	x	x	x	x	4
Affective strategies					
Self-encouragement	x	x	x	x	4
Anxiety reduction	x	x	x	x	4
Perseverance	x	x	x	x	4

Two Kinds of Practice

Formal versus functional practice is a common distinction, particularly when applied to the learner's practice of the L2. According to Bialystok (1981), formal practice is the specific exercise of the language code to master the rule system. Examples of formal practice include practicing newly learned verb tenses, making up rule exercises, and reciting sounds. Functional practice occurs when the learner uses the language for communication or comprehension purposes, such as watching a foreign language movie or talking with native speakers of the L2 (Bialystok, 1981). In the taxonomy, both formal practice and functional practice are listed as direct or primary learning strategies. Creating practice opportunities, on the other hand, is viewed as an indirect or support strategy in the taxonomy.

Social Strategies

Researchers have also recognized a category of "socially mediated" or "social" learning strategies (see Fillmore, 1976; Russo & Stewner-Manzanares, 1985). One social learning strategy is cooperating with peers to obtain feedback, to pool information, or to practice. These are called social cooperative strategies in the taxonomy. Other social learning strategies include asking questions for clarification; being attentive to social cues such as the speaker's body language, physical distance, sex, age, and social status; and actively seeking social situations in which to practice the L2. These are called communication strategies in the taxonomy. Social learning strategies are particularly important for exposing the learner to the target language, increasing the amount of interaction with native speakers, and enhancing motivation (Fillmore, 1976).

Other Strategies

Also included in the taxonomy are selected general study skills, like determining the optimal learning environment, organizing, scheduling, and being actively involved. These study skills, though useful in many settings and for many kinds of learning, are especially applicable to L2 learning.

Some affective (emotional or attitude-related) strategies are found in the taxonomy as well. An example is finding and implementing ways to cope with anxiety. While this strategy can be used in many other (nonlanguage) learning situations, it is particularly valuable in L2 learning--especially when oral production demands are high.

Certain strategies are useful for text processing in the native language as well as in L2. Examples include selecting the main idea, reading in broad phrases, and looking for clues in the way the text is organized. These text processing strategies are included in the taxonomy because they are very useful to intermediate and advanced L2 learners, although they may be of limited utility to beginning L2 learners.

The Taxonomy as a Framework

These distinctions--primary versus support, direct versus indirect, cognitive versus metacognitive, and so on--can become blurred in practice, largely because "directness," "primariness," or "cognitiveness" may be more a matter of degree than of category. Furthermore, certain individuals may use a strategy as a direct contribution to learning, while others may use the same strategy as only an indirect contribution to learning. Therefore, the classification of any strategy into one of these broad categories should not be considered absolute. The taxonomy is simply an attempt to provide a coherent, heuristic framework for discussing L2 learning strategies.

Both forms of the taxonomy, simplified and expanded, were used in the creation of the items for the SILL. See Oxford (1986d) for more details on the content and use of the taxonomy. The first version of the SILL is the topic of the next section.

FIRST INVENTORY: VERSION 1.1

This section describes the first version of the SILL and discusses the clinical trial of this version.

Description of Version 1.1

The first version of the SILL, known as Clinical Version 1.1 (Oxford, 1985a), consisted of 230 items, each of which described a strategy. The respondent was asked to circle the response which described how true the statement was of him or her using a five-point scale, ranging from "almost never true of me" to "almost always true of me." Response options were similar to those used in the Learning and Study Strategies Inventory (Weinstein et al., 1984). SILL respondents were asked to answer in terms of the language they were learning at the time or the language they most recently studied.

The first version of the SILL, like later versions, included a few strategies that are very common but are often seen as less than optimal, such as rote memorization (memorization without comprehension). Most items were worded in the positive direction, but some items were worded negatively to counter possible response biases. Clinical Version 1.1 was designed to be long and to some degree repetitive, so that the best wording could be discerned from among similar items and so that the least salient strategies could be eliminated or revised.

Clinical Trial of Version 1.1

The clinical trial of the SILL was held in June, 1985 and involved 23 participants, some of whom were native speakers of English who were studying a foreign language (Spanish) and some of whom were immigrants and refugees who were learning English. These participants, who were surveyed either individually or in small to medium-sized groups, were highly diverse in their language learning backgrounds and skills.

In addition to completing the SILL, the respondents also completed a background questionnaire indicating their native language, the language they used at home (in the U.S.), a judgment of their own degree of proficiency in the target language (either Spanish as a foreign language or English as a second language), the number of years they had lived in this country, and other relevant questions. After all 23 completed the survey and the background questionnaire, a sample of seven participants provided further comments about their reactions to the SILL through in-depth, structured interviews. The interviews asked for suggestions about items to be revised, added, or omitted; perceptions about what was learned, if anything, from taking the survey; and general attitudes about the survey. The seven participants who were interviewed each received \$15.00 for their detailed comments.

Data from the clinical trial were not used for statistical analysis. The goal of the clinical trial was to revise the survey based on participant feedback.

Results of the Clinical Trial

Results of the clinical trial indicated:

- o Most respondents completed the SILL, despite its length, in 45 minutes, although it took up to two hours for one or two students who were less proficient in English. Respondents recommended a shorter survey, which was the ultimate intent of the SILL author.
- o As expected, students commented that some items, e.g., those referring to L2 text processing strategies, were more relevant to intermediate or advanced learners than to beginners.
- o Almost all respondents stated that the SILL was interesting, several said it was "fun," and many said they gained new ideas from the SILL about how to learn languages. Respondents took seriously their job of answering the survey items and reviewing and commenting on the survey itself.
- o One respondent felt the need to add another scale to the SILL (in addition to the frequency-of-use scale). The scale she recommended would indicate the perceived importance or essentiality of the strategy. She felt that some strategies may be viewed as essential to learning an L2 well but are nevertheless hardly ever used, and that some strategies which are viewed as nonessential or even harmful are quite commonly used.
- o Several respondents suggested that some additional questions be added to the background questionnaire, such as "How good a language learner are you?," "How proficient do you want to become in the foreign language?," and "How proficient do you expect to become in the foreign language?" These questions are clearly different from the learner's judgment of his or her current L2 proficiency.

REVISION: VERSIONS 1.2 and 1.3

The clinical trial described above provided much useful grist for the mill of survey revision. This section discusses the next two versions of the SILL and then focuses on the field test of Version 1.3.

Description of Version 1.2

After the clinical trial, the SILL was revised extensively. From a set of similar items, the one or two items with the best wording were retained, and the others were omitted. Wording in general was sharpened and clarified. Clinical Version 1.2 (Oxford, 1985b), the resulting revision, consisted of 135 items and was about 42% shorter than the previous version in respect to the number of items.

A new scale for assessing the "essentiality" of strategies was included in the second version. The sponsor and the SILL author ultimately decided not to use this scale in subsequent versions of the SILL, because (despite the smaller number of items in this version of the survey) the addition of the essentiality scale would add more time to the administration of the survey.

Description of Version 1.3

SILL Version 1.3 (Oxford, 1985c; see Appendix C) was the same as Version 1.2 except that it omitted the essentiality scale. The instructions to respondents were similar to instructions for Version 1.1, with a focus on frequency of use of particular strategies. Version 1.3 was projected to take 25-45 minutes to administer.

Content Validity Assessment of Version 1.3

The SILL author and an independent language expert and teacher of Spanish, Mildred Cuevas, conducted a content validity assessment of Version 1.3. This assessment consisted of three steps:

1. The SILL author mapped each of the remaining 135 SILL items against the simplified taxonomy on which the SILL was originally based. This mapping served three functions:
 - a. To create an up-to-date "survey blueprint" indicating the taxonomic categories into which the survey strategies fell.
 - b. To determine the adequacy of the sampling of the strategies on the SILL from the universe of possible strategies as shown in the taxonomy. This determination answered questions such as, "How well were the strategies selected?" and "How good was the coverage of various types of strategies?"

- c. To determine the precision with which the strategies assessed by the SILL (phrased in first-person terms, such as, "I look for general grammatical rules and try to apply them") could be matched with the strategies in the taxonomy (phrased in impersonal terms, such as, "Rule Search/Application: Looking for, being aware of, and/or using rules in the L2").
2. At the same time, the other language expert independently conducted the same kind of survey-to-taxonomy mapping using the simplified taxonomy.
3. The SILL author and the other language expert then met and reviewed their findings, item by item.

The results of this process were as follows. First, it was determined that reliable survey blueprints (i.e., the survey-to-taxonomy mappings) were created by the independent language experts, since the two blueprints were correlated at .97. Second, it was found that the items in the SILL adequately covered the range of possible strategies shown on the taxonomy. Both of these findings supported the claim of strong content validity.

The entire process, steps 1-3, was repeated using the expanded taxonomy, which shows how each strategy is applied to each of the four language skills of reading, writing, speaking, and listening. The repeated process resulted in two new survey blueprints, one created by each of the two language experts, with an interrater reliability of .98, slightly higher than when using the simplified version of the taxonomy. Additionally, the repeated process once again demonstrated that the SILL adequately and clearly represented the range of potential strategies, even those from an expanded list.

Field Test of Version 1.3

The SILL was field tested at DLI in Monterey, California in November 1985. The field test was coordinated by the DLI Evaluation and Research Division and supported by the ARI Headquarters in Alexandria, Virginia and the ARI Field Unit in Monterey. Excellent support was provided by all participating agencies.

Version 1.3 (see Appendix C) was used in the field test. Administration took place during regular class sessions or language laboratory periods, with groups ranging in size from 40 to 120. The total number of participants was 483. Participation was described as voluntary, and almost all subjects opted to participate. Four language groups were represented: Korean, Russian, German, and Spanish. (One student of Chinese became so interested that he volunteered to take the survey, despite the fact that his class was not involved.)

DLI student cooperation was generally very high. However, a miscommunication resulted in the failure of the Russian Department to notify its students of the survey arrangements, thus causing initial confusion among students of Russian. The SILL data did not appear to be negatively affected by the Russian Department situation. Students appeared to be very interested in the survey. In fact, 100-150 of the students asked for more information on L2 learning strategies. Field test administrators took lists of names and addresses of those students who wanted further information. Two articles on the subject

(Oxford-Carpenter, 1985a,b) were later sent to the students with the cooperation of the ERIC Clearinghouse on Languages and Linguistics at the Center for Applied Linguistics.

Statistical Description of the Field Test Sample

The final sample used in the field test, after all unusable data were identified and discarded, consisted of 449 cases. This represents a 93% rate of usable data, which is extraordinarily high given the voluntary nature of the field test. This section presents the statistical highlights of the sample. Much more information on the sample is available from the author, including three-way breakdowns (for example, by sex, language group, and career field). In the following narrative, the percentages are rounded off to the nearest whole percentage; therefore, totals may exceed 100% in some instances due to rounding. Appendix D shows a statistical description of the field test sample using crosstabulations.

Students of Russian were the largest language group, with 48% of the sample, followed by students of German (21%), students of Korean (17%), and students of Spanish (17%).

Various branches of the military service showed different patterns of language enrollment. The majority (56%) of Army personnel were studying Russian, followed by German at 24%, Spanish at 11%, and Korean at 10%. Most (59%) of the Air Force personnel were studying Korean, followed by German (20% of the Air Force personnel), Spanish (18%), and Russian (3%). The Marines were split among Russian (44% of the Marines), Spanish (33%), Korean (17%), and German (6%). The Navy concentrated itself most heavily in Russian (71%), followed at a great distance by Spanish (21% of the Navy personnel), Korean (6%), and German (3%).

In both Russian and German, almost three-fourths of the students were Army personnel. Almost half (46%) of the students of Spanish were from the Army, although the Air Force and the Navy each provided over 20% of the Spanish students. Students of Korean mostly came from the Air Force (56%), followed by the Army (35%).

The primary military service branches were all represented in the sample. The Army made up 62% of the total, followed by the Air Force at 17%, the Navy at 15%, the Marines at 4%, and others (including some civilians) at 8%. The vast majority of the sample was composed of enlisted personnel at 92%, followed by officers at 6% and civilians at 3%.

Males comprised 77% of the sample, while females comprised 23%. As expected based on the overall sex distribution, most students in all languages were male: 86% of students of Korean, 78% of students of German, 75% of students of Spanish, and 74% of students of Russian were male. Among both males and females, nine out of ten were enlisted. However, 7% of the males were officers, compared with less than 1% of the females, the difference being made up mostly of people in the civilian category.

Respondents were asked to indicate whether they were in an intelligence career field, such as Human Intelligence (HUMINT) or Cryptology (SIGINT).

Specialties in these career fields include investigator, interrogator, voice intercept operator, and analyst-linguist, among others. Of the total sample, 87% responded that they were in one of these career fields, while 13% said they were not. Approximately the same percentages of males and females were in intelligence career fields (89% of the females, 87% of the males). Students of Russian and Korean included the greatest concentrations of intelligence careerists: 97% of Russian students and 99% of Korean students were in intelligence career fields, compared with 83% of Spanish students and 56% of German students. This would be expected from the currently sensitive political situations in the U.S.S.R. and Korea. Most of the students who were not in intelligence career fields were studying German (68%).

Field Test Student Comments

Many students stayed after the survey was over (on their own free time) to discuss the survey. Many offered unrequested ideas about their philosophies and psychologies of language learning and about their curriculum at DLI. These comments can be summarized as follows:

- o Some students suggested new items covering strategies such as using history and culture to enhance L2 learning; peer teaching; and working hard to learn the L2.
- o Many students offered suggestions about revisions of existing SILL items. Some students felt that functional practice items in the SILL (such as finding native L2 speakers with whom to converse and attending L2 events) were not relevant at DLI, because the DLI setting does not tend to foster such activities, particularly in less commonly taught languages like Korean. However, other students disagreed and felt that those items were some of the most important ones.
- o Some students felt that language learning "tricks," such as mnemonics, may be appropriate to one stage of learning but not to other stages. Therefore, it is important in assessing learning strategies to gather information on the person's stage of language learning.
- o Students appeared to be very interested in their own language learning strategies but knew little about such strategies. They felt that the survey helped them reflect on their own strategies, perhaps for the first time.
- o Although not asked about their language courses at DLI, some students nevertheless volunteered information on that subject. Several students expressed the need for more review and reinforcement of previously presented material at DLI, and others wanted more out-of-class opportunities for L2 use.

Now that the field test sample has been described and general comments of field test subjects have been presented, let us look at the key results of the field test in regard to SILL data. We will start with frequencies and percentages of item responses and then move to item intercorrelations, factor analysis, and reliability.

Frequencies and Percentages of Field Test Responses

This section presents the frequencies and percentages of field test responses in an item-by-item mode. Possible response options were defined as follows: "Almost never true of me" indicated "very rarely" or "only in very rare instances"; "generally not true of me" implied "less than half the time but more than in very rare instances"; "somewhat true of me" meant "about half the time"; "generally true of me" suggested "usually" or "more than half the time"; and "almost always true of me" indicated "in almost all instances."

Students marked their responses on a computer scannable answer sheet by blackening a circle under the appropriate letter, A through E (with A referring to "almost never true of me" and E referring to "almost always true of me"). In reviewing the results, the reader is asked to refer to Appendix C to see the complete wording of each item. In this narrative, only an abbreviated form of each item is presented.

Students' item-by-item responses were analyzed in terms of absolute and cumulative frequencies and percentages. Means (with A translated into 1, B into 2, C into 3, D into 4, and E into 5) were also calculated, along with standard deviations from those means. Of course, averaging the responses to create means implies that the data are of interval level. This can be justified to some extent by the definitions of terms as shown above, with "somewhat true" being the midpoint representing half the time, "generally not true" and "generally true" representing less than and more than half the time respectively, and "almost never" and "almost always" speaking for themselves. (Note that the means and the standard deviations were computed on the 358 cases which had complete data for all items on the SILL--no missing data whatsoever on any item--as preparation for the factor analysis, which required complete data on all items. The 358 cases represent 74% of the total data base of 483 cases, or 80% of the 449 cases which were seen as generally usable.) See Appendix E for complete data on item means and standard deviations.

Some highlights from these analyses included:

- o Two items had a mean response of "almost never true" (records words and definitions on a tape recorder; uses mirror to practice). No items had a mean response of "almost always true," although this response option was chosen by many students for particular strategies.
- o A mean response of "generally not true" was found for 24 items, many of which covered mnemonic strategies (e.g., memorizing complete wholes, using mechanical tricks for memorizing). A few of the items which received this mean response covered functional practice, such as attending L2 events. Some covered positive attitudinal strategies, like giving oneself a reward, while others concerned negative attitudinal strategies, such as giving up when the lesson is hard or fearing to use the L2.
- o A mean response of "sometimes true" was garnered by 72 items representing a whole range of strategies. Most functional practice items received this mean response.

- o Many formal practice strategies and communication strategies were among those which received a mean response of "generally true." Thirty-seven items had this mean response.

To be even more specific, we can see that the mean response options are linked to the SILL items in the following manner:

- o The following items had a mean response of "almost never true": 76, records word/definition; 130, uses mirror.
- o The following items had a mean response of "generally not true": 2, tests self; 6, plans daily/weekly; 7, uses rhyming; 11, attends L2 movies; 17, attends L2 events; 19, studies only with pressure; 21, fears using L2; 37, uses memory devices; 38, gives up when lesson is hard; 40, is unprepared for class; 43, memorizes by rote; 49, makes up sentences; 51, uses tape recorder; 52, sings in L2; 54, looks up all new words; 56, draws pictures; 57, plays L2 games; 59, makes up exercises; 83, acts out word; 93, memorizes complete wholes; 97, uses mechanical tricks; 98, lists related words; 103, gives self reward; 110, uses record book.
- o The following items had a mean response of "somewhat true": 1, talks to self in L2; 4, lists new info; 5, is easily distracted; 8, slows to catch errors; 10, uses mental pictures; 12, seeks L2 speakers; 13, uses filler words; 18, encourages own speaking; 24, uses audio and visual images; 25, makes L2 opportunities; 26, organizes to learn better; 27, asks for spelling; 28, reads aloud to concentrate; 29, uses phonological marks; 30, reads in L2; 31, takes notes in L2; 32, practices grammar; 35, uses time well; 36, skims passage first; 41, takes notes only in own language; 42, looks for cognates; 44, finds many ways to use L2; 45, visualizes situations; 46, reads in broad phrases; 47, uses positive self-talk; 50, repeats words; 53, reviews with others; 55, uses flashcards; 64, avoids hard topics; 65, repeats speaker's sentence; 67, requests pronunciation correction; 71, is anxious if does not understand; 73, reverts to L1 sometimes; 74, notices text layout; 75, breaks down list; 77, makes unusual links; 78, makes mental summaries; 81, guesses what speaker will say; 82, uses positives to increase confidence; 84, uses L1 structural knowledge; 85, decides to focus on specifics; 86, listens for organizers; 87, imitates speaker; 88, experiments with sounds; 89, checks notes with peers; 92, groups by attribute; 95, memorizes sounds to look up; 96, writes items repeatedly; 100, practices orally with peers; 102, does advance task planning; 104, notes L1 interference; 105, arranges environment; 106, relaxes before speaking; 107, plans long-range goals; 112, elaborates sentences; 113, drills words; 114, uses words immediately; 115, initiates L2 conversations; 116, rehearses next activity; 117, previews lesson; 118, reads story repeatedly; 122, generates/ revises rules; 123, paraphrases sentence; 124, infers by analogy; 125, finds meaning via analysis; 127, outlines main ideas; 128, summarizes L2 info; 129, talks only in L1 at parties; 131, finds cognates; 132, conducts long self-conversation; 133, translates verbatim; 135, remembers by location.

- o The following items had a mean response of "generally true": 3, answers questions mentally; 9, applies rules; 14, highlights when reading; 15, analyzes errors; 16, reads aloud to link sound/print; 20, asks for example; 22, notices body language; 23, makes link with old; 33, uses background knowledge in conversation; 34, uses communication tricks; 39, rehearses new items; 48, uses cues for meaning; 58, translates to native language; 60, speaks even with mistakes; 61, asks for help; 62, uses synonyms; 63, analyzes words; 66, finds L1-L2 contrasts; 68, requests slower speech; 69, uses all info in reading; 70, concentrates on speaker; 72, makes new combinations; 79, imitates L2 speakers; 80, monitors writing; 90, uses idioms/patterns; 92, guesses meanings from situation; 94, speaks mentally first; 99, visualizes spelling; 101, considers own L2 progress; 106, relaxes before speaking; 108, does self-diagnosis; 109, notes reaction of others; 111, looks for language patterns; 119, requests explanation, repetition, slower speech, 120, requests verification; 121, looks for exceptions; 134, overapplies rules.
- o The following items had a mean response of "almost always true": None.

Item Intercorrelations in the Field Test

A complete set of item intercorrelations (item 1 correlated with item 2, item 1 correlated with item 3, and so on for all 135 items) was created. Item intercorrelations are important for several reasons:

- o If one item is highly correlated with another item covering a similar strategy, a redundancy may exist.
- o If one item is highly correlated with another item covering a different strategy, there may be an interesting and as yet undiscovered link between the two strategies which should be explored. Alternatively, a response bias may exist.
- o If two similar strategies do not correlate highly, there may be a correctable problem with wording.
- o Predictably high or predictably low item intercorrelations may provide some evidence of construct validity of a given item or pair of items.
- o Item intercorrelations may help elucidate the factor structure of the survey.
- o High item intercorrelations may increase the internal consistency reliability of the instrument.

There were 53 items intercorrelations which were .40 or above. Most of these were in the .40-.60 range, but one was .75. Most of the intercorrelations at .40 and above were predictable due to the nature of the items involved. For example, items concerning functional practice (e.g., attending L2 events, making L2 opportunities, attending L2 movies, finding many ways to use the L2, and so on) were moderately to highly correlated with each other. The three

items related to imagery and visualization were correlated in this range. Good use of time was negatively related to studying only under pressure and to being unprepared for class, but it was positively related to previewing lessons before class (all at correlations of .40 and above). Items concerning inferencing were intercorrelated at this level. Items related to self-praise, self-reward, and increasing one's self-confidence in L2 learning were highly intercorrelated. Some items on formal practice had moderate intercorrelations as well.

More specific information on intercorrelations at .40 or higher is shown in Table 5. Highly intercorrelating item pairs are clustered by content, such as functional practice. However, in some cases one item might fall into a given category (e.g., item 44, finds many ways to use the L2--functional practice), while an item which correlates highly with it might fall into a different category (e.g., item 32, practices grammar--formal practice). In these instances, the item pair which represents two categories is simply placed into one of the two categories for purposes of grouping.

Factor Analysis

We have just discussed item intercorrelations. Now we turn to one of the primary aspects of the field test results: factor analysis.

A factor analysis of the student responses was conducted to determine which factor patterns and item-on-factor loadings existed in the data. Promax oblique rotation was used along with "principal factor analysis" according to the guidelines in the Statistical Analysis System (SAS) manual (SAS Institute, 1985). Promax oblique rotation is a way of obtaining an oblique solution by using some functions of the orthogonal solution as the target matrix. As stated by Kim and Mueller (1978, p. 40):

The rationale behind the promax rotation is that the orthogonal solutions are usually close to the oblique solution, and by reducing the smaller loadings to near-zero loadings, one can obtain a reasonably good simple structure target matrix. Then by finding the best fitting oblique factors for this target matrix, one obtains the desired oblique solution.

Criteria for retaining factors included: a minimum eigenvalue (characteristic root) of 1; a maximum of 10 factors; and an 80% proportion of variance accounted for by the factors.

The results of the factor analysis (a) support the construct validity of the survey and (b) indicate that there are some clear factors which relate to constructs in the learning strategy taxonomy and in the general research literature about learning strategies.

Appendix F shows the promax-rotated factor pattern for the ten factors in terms of standardized regression coefficients. Appendix G displays the factor structure in terms of correlations. Interfactor correlations are found in Appendix H.

Appendix I conveniently summarizes the key elements of the factor analysis, with one factor per table:

Table 5

Item Intercorrelations at .40 and Above

Item numbers and content	<u>r</u>
<u>Listing, notetaking, or formal practice strategies:</u>	
4/110, lists new information, uses record book	.41
14/4, highlights when reading, lists new information	.44
41/31, takes notes only in own language, takes notes in L2	-.44
98/59, lists related words, makes up exercises	.44
59/54, makes up exercises, looks up all new words	.40
59/49, makes up exercises, makes up sentences	.40
84/66, uses L1 structural knowledge, finds L1-L2 contrasts	.42
63/125, analyzes words, finds meaning via analysis	.56
<u>Functional practice strategies:</u>	
17/11, attends L2 events, attends L2 movies	.43
17/12, attends L2 events, seeks L2 speakers	.48
18/12, encourages own speaking, seeks L2 speakers	.48
11/25, attends L2 movies, makes L2 opportunities	.45
30/11, reads in L2, attends L2 movies	.42
30/12, reads in L2, seeks L2 speakers	.43
44/12, finds many ways to use L2, seeks L2 speakers	.52
60/12, speaks even with mistakes, seeks L2 speakers	.47
115/12, initiates L2 conversation, seeks L2 speakers	.62
17/25, attends L2 events, makes L2 opportunities	.41
30/25, reads in L2, makes L2 opportunities	.51
44/18, finds many ways to use L2, encourages own speaking	.51
44/25, finds many ways to use L2, makes L2 opportunities	.41
52/17, sings in L2, attends L2 events	.41
1/44, talks to self in L2, finds many ways to use L2	.42
115/44, initiates L2 conversation, finds many ways to use L2	.49
12/60, seeks L2 speakers, speaks even with mistakes	.47
18/60, encourages own speaking, speaks even with mistakes	.53
44/60, finds many ways to use L2, speaks even with mistakes	.45
115/60, initiates L2 conversation, speaks even with mistakes	.53
114/115, uses words immediately, initiates L2 conversation	.42
1/132, talks to self in L2, conducts long self-conversations	.58
44/32, finds many ways to use L2, practices grammar	.40
<u>General study skills:</u>	
19/35, studies only with pressure, uses time well	-.43
40/35, is unprepared for class, uses time well	-.41
117/35, previews lesson, uses time well	.48

Table 5 (Continued)

Item numbers and content	<u>r</u>
<u>Communication strategies:</u>	
119/68, requests explanation/repetition/slower speech, requests slower speech	.43
62/34, uses synonyms, uses communication tricks	.52
<u>Inferencing strategies:</u>	
69/48, uses all information in reading, uses cues for meaning	.51
91/69, guesses meaning from situation, uses all information in reading	.42
48/91, uses cues for meaning, guesses meaning from situation	.42
<u>Resourcing strategies:</u>	
76/51, records word/definition, uses tape recorder	.42
126/14, uses references, highlights when reading	.40
<u>Mnemonic strategies:</u>	
130/83, uses mirror, acts out word	.41
88/87, experiments with sounds, imitates speaker	.47
112/49, elaborates sentences, makes up sentences	.40
39/16, rehearses new items, reads aloud to link sound/print	.43
7/37, uses rhyming, uses memory devices	.41
<u>Affective strategies:</u>	
82/47, uses positives for confidence, uses positive self-talk	.75
106/105, relaxes before speaking, arranges environment	.41
103/82, gives self reward, uses positives to increase confidence	.43
<u>Social cooperation strategies:</u>	
53/89, reviews with others, checks notes with peers	.46
<u>Imagery strategies:</u>	
24/10, uses audio and visual images, uses mental pictures	.55
45/24, visualizes situations, uses audio and visual images	.40
45/10, visualizes situations, uses mental pictures	.48

- o Factor number (refers to promax-rotated factors).
- o Factor title (as inferred from the general content of the items loading highly on the rotated factor).
- o Items which load highly on the rotated factor (by number and theme).
- o Loading of the item on the rotated factor in terms of standardized regression coefficient (loading #1); minimum for inclusion in the tables was a .30 standardized regression coefficient.
- o Loading of the item on the rotated factor in terms of Pearson correlation (loading #2); this loading was included for all items which had a .30 minimum standardized regression coefficient, but no minimum Pearson correlation was required for inclusion in the tables.

The reader is urged to consult Appendix I for more details on the results of the factor analysis. This section of the text presents a discussion of the rotated factors which emerged from the analysis. The most striking feature of the rotated factors was their generally high degree of internal (within-factor) cohesion and apparent meaningfulness. Many factor analyses fail to produce factors which are as interpretable as the ones found here.

Factor 1 appears to load heavily on general study habits, such as previewing lessons, using time well, being unprepared for class (negative loading), studying only with pressure (negative), arranging the environment, etc. Some general reading strategies are also included, such as highlighting when reading, reading the story repeatedly, skimming the passage first, etc. Additionally, some self-monitoring skills (which might be considered part of the general study habit group) also load on this factor.

Factor 2 is a "pure" and easily interpretable factor. It consists of items which involve actively using the L2 in functional practice: seeking L2 speakers, initiating L2 conversation, attending L2 events, finding ways to use the L2, speaking the L2 even with mistakes, talking to oneself in the L2, encouraging one's own speaking, reading in the L2, making L2 opportunities, using filler words to keep an L2 conversation going, singing in the L2, attending L2 movies, conducting long L2 self-conversations, playing L2 games, taking notes in the L2, using L2 words immediately, and using L2 idioms and patterns. All of these are evidence of active, functional use of the language.

Meaning--the search for it and the communication of it--is the heart of Factor 3. A great deal of inferencing (e.g., using cues for meaning, analyzing words for meaning, using all information in reading, guessing meanings from the situation, noticing text layout as a clue for meaning, looking for cognates, using L1 structural knowledge as a clue, noticing body language, guessing what the speaker will say, listening for organizers, and so on) is included in Factor 3 as a means of finding the meaning involved in a reading passage or a conversation. Additionally, there are some items which help one communicate meaning to someone else: using communication tricks, using synonyms, and imitating L2 speakers.

Factor 4 is very interesting. It contains a number of strategies which involve types of practice generally done alone, without the involvement of other people. These strategies include listing related words, using a mirror, recording words and definitions on a tape recorder, acting out new words, elaborating sentences, making up exercises, experimenting with sounds, memorizing sounds to look them up later, drawing pictures of new words, using a record book, and so on. One item included in this factor, imitating an L2 speaker, could be done alone or in a conversation. The factor also includes some items which signify fear or lack of confidence, such as being afraid to use the L2, looking up all words, and giving up when the lesson is hard. Taken together, these items suggest that some of the "solitary" or "loner" types of learning strategies might go hand in hand with a lack of confidence and a general trepidation about using the L2 in a real-life, functional situation involving other people.

Factor 5 seems to center on use of mnemonic devices, such as finding cognates, making unusual memory linkages, using rhyming to help memorize, using phonological marks to help remember sounds, remembering by location, and using imagery for memorization. One other item, taking notes only in the L1, is also included in this factor. This combination of items might lead one to suspect that the factor refers mainly to early stages of learning the second language, when notetaking in the L1 and use of a variety of mnemonic devices are prevalent.

Factor 6 is clearly a "negative" factor in that it involves a great deal of reliance on the L1 or on the other speaker in a conversation, and it includes anxiety about not understanding. L1 dependency is shown in translating to the L1, reverting to the L1, and translating verbatim. Reliance on the other speaker is exhibited in asking for help, slower speech, explanation, verification, etc. Anxiety about not understanding the meaning of a conversation is the focus of one of the items.

Formal practice is the central theme of Factor 7. Application and over-application of rules, practice of grammar, error analysis, pattern search, and mental speech are all included here.

An array of metacognitive strategies is covered in Factor 8, which focuses on self-encouragement, self-reward, planning, and considering one's own L2 progress.

Factor 9 includes items involving visualization, mental imagery, and making new combinations. Internal information processing which involves images is the core of this factor.

Factor 10 is slightly less clear. It involves showing initiative in formal aspects of language learning (such as generating and revising rules and looking for exceptions to rules), summarizing L2 information, and requesting verification.

Although most of the SILL items from Version 1.3 loaded at .30 or above on at least one of the factors, 26 of the 135 items did not. These were: 4, 8, 20, 28, 43, 50, 51, 53, 64, 67, 70, 85, 89, 92, 93, 96, 97, 100, 104, 106, 107, 109, 116, 124, 127, and 129. A couple of these items (8 and 93) were omitted

in the next version of the SILL due to their low loadings, low frequencies, or redundancy. .43; item 31, loading on Factor 2 at .35 and Factor 4 at .30; item 110, loading on Factor 1 at .30 and Factor 4 at .35; item 120, loading on Factor 6 at .34 and Factor 10 at .30; and item 128, loading on Factor 1 at .36 and Factor 10 at .32.

Reliability Assessment

While the factor analysis is interesting and meaningful, it takes on still greater importance in light of reliability findings. The reliability of Version 1.3 of the SILL was assessed using Cronbach's alpha on the field test data. Cronbach's alpha is the most popular "internal consistency" reliability estimation method. "Split-half" reliability estimation methods require splitting the test into even-odd items or into first and second halves, and such methods can produce different reliability coefficients depending on the way the total set of items is subdivided. In contrast, internal consistency reliability methods, such as Cronbach's alpha, do not require splitting the test in any way; they require only a single test administration and provide a unique estimate of reliability for the test administration (Carmines & Zeller, 1979).

Cronbach's alpha is a generalization of a coefficient introduced by Kuder and Richardson (the KR20) to estimate the reliability of scales composed of dichotomously-scored items. Cronbach's alpha can be used with non-dichotomously-scored items. The formula for Cronbach's alpha is:

$$\alpha = N/(N-1) [1 - \sum \sigma^2(Y_i) / \sigma^2 \bar{X}]$$

where N is equal to the number of items in the instrument; $\sum \sigma^2(Y_i)$ is equal to the sum of the item variances; and $\sigma^2 \bar{X}$ is equal to the variance of the total composite. As might be understood from the formula, the value of alpha depends on the average interitem correlation and the number of items in the scale. As the average correlation among the items increases and as the number of items increases, the value of alpha increases. (However, adding items indefinitely makes progressively less impact on the reliability. Also, adding items to a scale can, in some instances, actually reduce the lengthened scale's reliability if the additional items substantially lower the average interitem correlation, as pointed out by Carmines and Zeller.)

As noted by Carmines and Zeller, the interpretation of Cronbach's alpha is closely related to that of split-half and alternate forms reliabilities.

Specifically, coefficient alpha for a test having 2N items is equal to the average value of the alpha coefficients obtained for all possible combinations of items into two half-tests. . . . Alternatively, alpha can be considered a unique estimate of the expected correlation of one test with an alternative form containing the same number of items. . . . Coefficient alpha can also be derived as the expected correlation between an actual test and a hypothetical alternative form of the same length, one that may never be constructed. (Carmines & Zeller, p. 45).

It is also important to note that alpha provides a conservative estimate of a measure's reliability. In general, alpha is a lower bound to the reliability of an unweighted scale of N items (Carmines & Zeller, p. 45). In other words, other types of reliability coefficients are expected to be higher than coefficient alpha.

Cronbach's alpha was calculated using the reliability program in the Statistical Package for the Social Sciences, Version X (SPSS, Inc., 1986). The SAS data set was transformed to an SPSS data set in order to conduct the reliability analysis.

Table 6 shows the reliabilities for the whole survey and for each of the ten factors described earlier. See Appendix J for complete details on the number of items per factor, the content of those items, and the reliability coefficients. The main point to emphasize is that the overall reliability for the survey is extremely high, .95. Furthermore, all factors except one are moderately to highly reliable, in the range of .62 - .87. Factor 6, unlike the other factors, has a relatively low reliability, .31. Because of the unreliability of that factor, it is important in future SILL analyses not to use Factor 6 on a factor. For example, it would not be reasonable to create factor scores for individual students using Factor 6. Eliminating Factor 6, we find that the average reliability of the remaining nine factors is .73. If Factor 6 is retained, the average reliability of the ten factors is .69. (Note that the average reliability of the factors is naturally not as great as the reliability of the whole survey, .95, due to the small number of items per factor compared to the large number of items in the whole survey.)

Before the reliability assessment was conducted, items which expressed a given strategy in a clearly negative way were statistically reversed so that the response options were in the same directions as strategies expressed in a positive way. For example, the item related to studying only when under the pressure of a test was expressed negatively in the survey but was statistically reversed prior to the reliability assessment. Such items included: 5, 8, 19, 21, 38, 40, 41, 43, 58, 71, and 129.

As noted earlier, five items loaded at .30 or above on two factors (items 24, 31, 110, 120, and 128). Because the loadings for each of these items were almost equivalent on each of the two factors on which the item loaded, it was not possible to clearly place a given item in only one of the two factors. Therefore, the factor-by-factor reliability assessment used these five items on each of the two factors on which they loaded highly. Of course, the whole-survey reliability assessment used each of these items only once.

Assessment of Social Desirability Response Bias

Internal consistency reliability in the form of Cronbach's alpha has just been discussed for Version 1.3 of the SILL. Social desirability response bias was also assessed.

Table 6

Cronbach's Alpha Internal Consistency Reliability Coefficients for the Whole Survey and for Each of the Ten Factors

<u>Factors</u>	<u>Alpha</u>
All	.95
1	.86
2	.87
3	.84
4	.75
5	.62
6	.31
7	.60
8	.73
9	.69
10	.63
Average of 9 Factors (Excluding Factor 6)	.73
Average of 10 Factors	.69

The possibility of social desirability response bias--the tendency to answer in a way thought to be socially acceptable or desirable--was carefully monitored by examining the field test statistical results and the students' informal comments. The conclusion reached was that the field test of the SILL failed to show social desirability response bias patterns.

This statement can be substantiated by the statistical results. For example, most students answered "generally true" to the question about over-applying rules and "somewhat true" to the question about slowing down too much in an effort to catch one's own errors, both of which might be seen as socially undesirable behaviors. A socially desirable response pattern might show most students answering that those statements were generally not true or almost never true of them.

Conversely, statistical results also showed that respondents generally did not plan daily or weekly, attend L2 events, or give themselves rewards--all strategies which could be seen as positive or socially desirable in many circumstances. A socially desirable response pattern would indicate that students generally did those desirable behaviors.

These and other statistical results implied that students were realistic and honest about their use of strategies. Such results were supported by students' informal comments in writing during the field test and in person afterwards.

This discussion has presented the results of the field test of Version 1.3 of the SILL in terms of student comments, frequencies, percentages, item inter-correlations, factor analysis, reliability assessment, and assessment of social desirability response bias. The next section presents a revised version of the SILL, known as Version 2.1

REVISION: VERSION 2.1

Version 2.1 of the SILL (see Appendix K) is the first version of the instrument to be developed using field test input. It contains 121 items and is projected to take 20-40 minutes to administer. This version is being used for full-scale data collection in the Language Skill Change Project and in further reliability and validity studies at Purdue University. Changes appearing in Version 2.1 were based on the following sources of information:

- o Field test statistical data, such as frequencies, percentages, item intercorrelations, and factor loadings
- o Field test comments from participants
- o Comments by language experts
- o Results of matchings between the survey and the taxonomy
- o The author's own perceptions.

In general, the revisions created greater specificity (e.g., in-class versus out-of-class strategies) and clarity (e.g., only one behavior assessed in a given question, not two related behaviors). Some new and important strategies were added to the survey, such as peer teaching and learning culture and history as a way of strengthening L2 skills.

The format was changed to include the five possible response options at the top of every page. This will enhance ease of responding. The two extreme options were changed to read, "never or almost never true of me" and "always or almost always true of me."

In the field test, students were encouraged to write comments in the survey booklet. However, in using Version 2.1 students will be asked to refrain from adding comments in the booklets.

As noted above, the factor analysis of Version 1.3 (the field test version) resulted in most items loading at .30 or above on at least one of the factors and 26 items not loading at that level on any of the factors. In the development of Version 2.1, some of the 26 items were omitted because of their relatively low factor loadings. However, others of the 26 low-loading items were retained, because they were viewed as probably relevant to second language learners who do not fit the description of the DLI field test participants. Examples of learners who are unlike the DLI field test participants are language students in different settings (e.g., college or university classes or immersion programs like Berlitz), at different stages of language learning, studying different languages, having different purposes or motivations for language learning, or possessing different levels of language aptitude from those in the DLI sample.

POST-TRAINING FORM: VERSION 2.2

In addition to the regular SILL designed to be used during language training, the Language Skill Change Project expressed the need for a shorter version of the SILL to be used for measuring strategy use by military intelligence careerists after their language training was completed. The strategies to be measured had to be usable outside the classroom and employable to maintain language skills which had already been developed.

The shorter version of the SILL is called Version 2.2, the Post-Training Form. This form was developed by a four-step process:

1. A general blueprint of Version 2.2 was developed, with the idea that this form would contain a good representation of items from all ten factors (see the factor analysis results) and would have 45-50 items. In general, the concept was to eliminate items which did not load at the level of .30 or above on any of the factors. Of course, applicability to the post-language-training environment was a crucial criterion in the blueprint, as well.
2. Next, items were selected for the new, shorter form. The criteria listed above (representation of all ten factors, elimination of low-loading items, and relevance to the post-language-training setting) aided selection of items. In a few cases, changing one word in an item was enough to extend the item's applicability from the classroom to the post-language-training environment. The resulting form included the following number of items per factor: Factor 1 (F1), general study skills, six items; F2, functional practice, five items; F3, communicating/understanding meaning, seven items; F4, solo strategies and fear, three items; F5, mnemonics, five items; F6, dependency on the L1 or on the other speaker, five items; F7, formal practice, four items; F8, self-encouragement, two items; F9, imagery, four items; and F10, initiating certain aspects of formal practice, four items.
3. Next, one item (long-term goal setting) was added that did not load highly on any factor in the DLI field test analysis. This was added because long-term goal setting may be more meaningful to people who have completed their initial, classroom-based training at DLI and are trying to maintain and extend their language skills in a much more individual, self-directed way.
4. Finally, three strategies which were not included in the field test form (1.3) but were added to Version 2.1 were included in the Post-Training Form (2.2) on the assumption that they might be important to language skill maintenance.

The total number of items in the Post-Training Form is 47. Expected administration time is 10-15 minutes. All ten factors are represented, along with a few items which represent no particular factor (according to the field test factor analysis). It will be possible to analyze this form of the SILL to determine whether similar factors appear for individuals who are no longer in official language training programs. It will also be possible to create factor scores for these individuals and relate those scores to a number of key

variables (including language proficiency ratings and other data reflecting the degree of language skill loss or maintenance after training is over).

Version 2.2 is shown in Appendix L. Appendix M displays the correspondences among items in three SILL forms--1.3 (the field test version), 2.1 (the most recent full-length version), and 2.2 (the shortened Post-Training Form)--and their relationship to the expanded taxonomy of second language learning strategies.

The development of the SILL through its various iterations and the analytic work already completed have been described in this section and previous ones. The next section indicates further analytical work that should be done.

FURTHER ANALYTICAL WORK TO BE DONE

Several more analytical studies of the SILL remain to be done, including the following:

- o It is important to determine the short-term test-retest reliability of the SILL (with the second administration within two weeks after the first one). Data have already been collected at Purdue University to allow this type of reliability assessment to be accomplished.
- o It is very useful to correlate students' SILL responses, which indicate frequency of strategy use, with various kinds of background data (for instance, language aptitude scores, L2 achievement grades, overall L2 proficiency, years of previous L2 study, and so on). The Language Skill Change Project provides this opportunity. In addition, some of these correlations can also be made using field test data and Purdue data.
- o A longitudinal analysis of changes in strategy use (and in changes in L2 proficiency across time and under varying circumstances) would be very valuable. It would improve current understanding of the developmental nature of L2 learning strategies at various stages of L2 proficiency. This type of analysis will take place through the Language Skill Change Project by using the full-length version of the SILL (2.1) during language training and the shorter, Post-Training Form (2.2) after language training is completed.
- o Individuals' factor scores on the SILL should be calculated and subsequently correlated with other cognitive and personality measures, such as measures of memory, reasoning, field dependence, etc. Such analyses are expected in the Language Skill Change Project.
- o The SILL factor structure should be reassessed using new data from the Language Skill Change Project and the Purdue study (both using the full-length revision, Version 2.1). Also, the factor structure of the Post-Training Form (2.2) should be determined to see whether there are any important differences in strategy use in the language classroom versus the post-language-training environment.

- o Where it is possible, similar analyses should be designed and conducted across studies. For instance, McGroarty's study at the University of California at Los Angeles using a different L2 strategy instrument (McGroarty, 1985), the Purdue study, and the Language Skill Change Project could conduct similar analyses of L2 learning strategy data. In this way results could be compared. Often researchers conduct analyses on similar topics in different ways, with the net results being a lack of comparability and an ultimate loss of potentially useful cross-study information.
- o Results of SILL use in various contexts and studies could be compared with findings from previously developed general learning strategy instruments (e.g., Weinstein et al., 1984).

This section has discussed future analyses that should be done involving the SILL. Now let us examine what makes the SILL different from other learning strategy instruments.

COMPARISON BETWEEN THE SILL AND OTHER GENERAL AND L2 LEARNING STRATEGY INSTRUMENTS

Almost all researchers who have commented on the subject of learning strategy measurement have indicated that observational instruments and related techniques, such as videotaping, are of little help in assessing the use of learning strategies--many of which are used in ways which are not observable in the typical laboratory or classroom setting due to their mentalistic and/or extracurricular nature (see, for example, Rubin 1981; Cohen & Aphek, 1981; O'Malley, Russo, & Chamot, 1983). Most of these researchers found that self-report surveys were more accurate and useful than observational instruments.

However, self-report surveys of learning strategy use also have problems. The typical learning strategy instrument, as evaluated by Dansereau, Long, McDonald, and Actkinson (1975) and Weinstein et al. (1984), and as observed by the author of the current report, shows the following difficulties:

- o Inconsistent strategy definitions
- o Low or unassessed reliability of the overall instrument
- o Low reliability of subscales, even though the overall instrument might be reliable
- o "Fakability" of some responses based on social desirability response bias
- o Lack of empirical validation of good strategies
- o Limited diagnostic capability
- o Fragmentary measurement approaches.

Most L2 learning strategy instruments which currently exist suffer from some or all of these problems. Many such instruments lack field test data on their psychometric quality and were developed very informally for limited, local use. The SILL was designed to overcome many measurement difficulties which typically besiege L2 learning strategy instruments.

Let us look at how the SILL compares with most of the previous learning strategy instruments by examining the difficulties listed above and indicating how the SILL has overcome these problems.

- o Unlike many other surveys of learning strategies, the SILL was developed from a comprehensive, systematic taxonomy of L2 learning strategies. The taxonomy itself was created as a result of an extensive research review of general and L2 learning strategies. Unlike other taxonomies of L2 strategies, the taxonomy exists in a simplified form and an expanded form. In the expanded form each strategy is linked with the particular language skill(s)--listening, speaking, reading, and writing--to which the strategy best applies. This approach ensures detailed and consistent strategy definitions.
- o Although many learning strategy instruments have either no assessment of overall reliability or have a low assessed reliability, the SILL has a reliability of .95 for the whole survey using Cronbach's coefficient alpha. Furthermore, analysis of the test-retest reliability of the SILL is underway.
- o Reliability for the subscales or factors of the SILL is moderate to high. Nine of the ten factors are in the range of .60 to .87. The least reliable factor is .31. Eliminating that factor brings the average reliability per factor to .73; otherwise it would be .69, which is still good considering the self-report nature of the survey.
- o Using field test data, subjects' survey responses were statistically monitored for social desirability response bias. Additionally, subjects' voluntary comments were examined and compared with their survey responses. These examinations showed that social desirability response bias did not appear to be operating in the DLI field test of the SILL.
- o Empirical validation of good strategies is taking place in a major investigation, the Language Skill Change Project, in which SILL factor scores and response frequencies are being correlated with a number of key variables, such as language proficiency and language course grades. Of course, what is a "good" strategy for one person may not be a "good" strategy for another, so the Language Skill Change Project is also correlating SILL data with individuals' background characteristics, including previous second language learning experience, length of time studying the target language, language aptitude, attitudes, motivations, and so on.
- o The length of the SILL and its detailed coverage of the strategies included in the taxonomy make the SILL potentially useful for diagnosis of student difficulties in the use of L2 strategies.

- o The measurement approach to developing the SILL was unified, rather than ad hoc or fragmentary. First, the content validity of the SILL was meticulously assessed using a survey blueprint and repeated matchings of SILL items against the taxonomy (in both its simplified and expanded versions) by the author and an independent subject matter expert. Second, the SILL was then tested in a clinical field trial of 23 subjects. It subsequently went through two more revisions before being used in a field test. Third, the SILL was field tested using a 483-person sample of L2 students who had different backgrounds, different language aptitudes, and different language learning experiences and who were studying four languages ranging in difficulty from "easy" (much like their native tongue) to "difficult" (very different from their native tongue). Fourth, the field test data were subjected to a variety of statistical analyses to determine the psychometric quality of the instrument. Construct validity, based on factor analysis and other techniques, appears quite strong, as does internal consistency reliability. Further psychometric analyses are planned.

These and other characteristics of the SILL distinguish the survey from most other general and L2 learning strategy instruments. These attributes make the SILL psychometrically stronger than most other self-report learning strategy surveys.

SUMMARY

This report has described the development and psychometric testing of the Strategy Inventory for Language Learning, or SILL. The SILL assesses the frequency of use of a variety of strategies for learning a second language. SILL items were based on a taxonomy of second language learning strategies developed by the author. Results of a large-scale field test indicated that the SILL has very high internal consistency reliability (.95). Content validity based on ratings of the correspondence between SILL items and taxonomy items (as judged simultaneously by two raters) was .98. Factors arising from a factor analysis were relatively clear and interpretable. Some of the key factors were related to general study skills, functional practice, searching for and communicating meaning, formal practice, mnemonics, and imagery.

The SILL is being used in the military Language Skill Change Project. In addition to this immediate application, the SILL has many other practical uses for students, teachers, counselors, curriculum designers, language program administrators, researchers, and others who are interested in how people learn languages.

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